

## **Chapter 5. Overview of Recovery and Management in the ARMP**

Recovery of at-risk abalone species and management of abalone fisheries are separate but continuous and complementary processes in the ARMP. The recovery portion of the plan addresses the seven species in central and southern California (red, pink, green, black, pinto, flat, and white) that currently have severely reduced populations and reduced ranges. The management portion of the plan applies to stocks that are considered sustainable for fishing. The management plan will initially apply to the northern California red abalone fishery, but ultimately will apply to any fully recovered species in central and southern California, outside of the sea otter range.

Abalone in California vary in status from populations bordering on extinction (white abalone) to a sustainable population with surplus stock that is still being fished (northern California red abalone). The ultimate goal of recovery is to move species from a perilous condition to a sustainable one with surplus stocks available for fishing. The ultimate goal of management is to maintain sustainable fisheries under a long-term management plan that can be adapted quickly to respond to environmental or population changes.

The primary criteria used to evaluate progress in achieving recovery and management goals involve estimates of recruitment and population abundance (measured by density). For stocks with very low densities, evidence of recruitment is used as one of the first indicators that stocks are recovering. For fished stocks, recruitment is important to ensure that animals removed from the fishery will be replaced, and is used with density criteria to trigger management actions. Two density levels are integral to both recovery and management as measures of population abundance: minimum viable population size (MVP, 2,000 ab/ha) (Section 6.2.2.1) and a sustainable fishing density (6,600 ab/ha)(Section 6.2.2.2, Section 7.1.2.1). Abalone populations below the MVP (Figure 5-1) are at risk of recruitment failure and ultimately extinction, and require recovery. Populations at or above the upper limit of the precautionary area (Figure 5-1) are likely to have excess stock to support fishery take without the need for a precautionary approach.

The precautionary area (Figure 5-1) is where recovery and management overlap. The precautionary area is bounded on the lower end by an abalone density that combines the MVP with an additional density buffer (50% of the MVP), and on the upper end by the upper limit of the precautionary area. Populations in the precautionary area are likely to be self-sustaining (experiencing successful reproduction and recruitment to survive natural fluctuations in abundance), but excessive fishing mortality could cause these populations to decline. Abalone populations in fisheries that have been closed are subject to recovery in the precautionary area, and no fishing is proposed for these populations until the sustainable fishery density is reached. Abalone populations being actively managed as part of a fishery, however, may be fished while their abundance level is in the precautionary area, but with progressively reduced take. The precautionary area thus acts as a buffer between conditions that mandate fishery closure and those that allow fishery reopening: conditions for fishery reopening are set at the sustainable fishery density (6,600 ab/ha) (Section 6.2.2.2) to ensure that a fishable surplus has been rebuilt.

Criteria in the ARMP are evaluated over time at index sites in areas of important abalone habitat that have experienced high use in former or current fisheries. Assessment costs for recovery and management are minimized by sharing resources among governmental agencies and the private sector, and by alternating efforts between regions.

Because several species in central and southern California are deemed to be at high risk, during the first 7 years of implementation the majority of research will be directed towards recovery. Recovery efforts will initially focus on assessing the relative risk of extinction, identifying where remnant populations remain, developing recovery techniques, and using these techniques to rebuild populations of at-risk species to self-sustaining levels. An ideal abalone recovery trajectory is represented by the upward diagonal line in Figure 5-1.

Recovery is a stepwise process, where goals must be met sequentially. Once recovery goals are met, a species may be evaluated and considered for a fishery. Recovery success will be evaluated at index sites in recovery areas to determine when critical densities are attained. Before a fishery will be considered, area-wide recovery must occur for a species. Area-wide recovery is accomplished when three-quarters of the recovery areas have met all the recovery criteria; recovery in a single area alone will not provide adequate insurance against future catastrophic events such as disease, pollution, or the expansion of sea otter populations.

The management portion of the ARMP establishes guidelines for determining allowable take levels and for closing and reopening fisheries. During the first 7 years of ARMP implementation, management of the existing fishery will occur with limited resources under an interim plan that sets a total allowable catch level and uses established criteria to guide regulatory change. However, because the interim plan operates in a data-limited environment, it follows a precautionary approach to setting take. Under the interim plan, fishery closure (zero take) occurs when average densities at four index sites fall below 3,000 ab/ha (the MVP with a 50% precautionary buffer). If additional resources become available, a long-term management plan may be implemented using zonal management with take allocated through an abalone tag system. The long-term plan allows management with greater precision on a localized basis. The long-term plan would require increased assessment and enforcement, but is more responsive to stock changes and can therefore be less precautionary. Because of the use of zones in the long-term plan, total fishery closure is less likely. However, at least half of the zones must continually have densities above 3,000 ab/ha in order for a fishery to remain open under this plan (Section 7.1.3.4).

MPAs that provide refuge from take for all species play an important role in the ARMP for both recovery and management. They are important during the critical early phase of recovery because recovery techniques are most likely to succeed in areas with enhanced protection from poaching. In the management of the existing recreational red abalone fishery, a *de facto* depth refuge (protected area) exists because divers are limited to breath-hold diving. MPAs, with adequate enforcement, should be required under the long-term management plan for species for which a breath-hold only fishery is impractical. MPAs are currently being considered under the Marine Life Protection Act and are needed as soon as possible for abalone.

The ARMP is meant to be adaptive. A timeline has been established for the first 7 years of ARMP implementation. The plan will be reviewed in 2009. Revisions to evaluate success and funding needs and to refocus efforts will be performed when needed. In 2009 the Department, along with constituents, will develop a new timeline.

### ARMP Approach

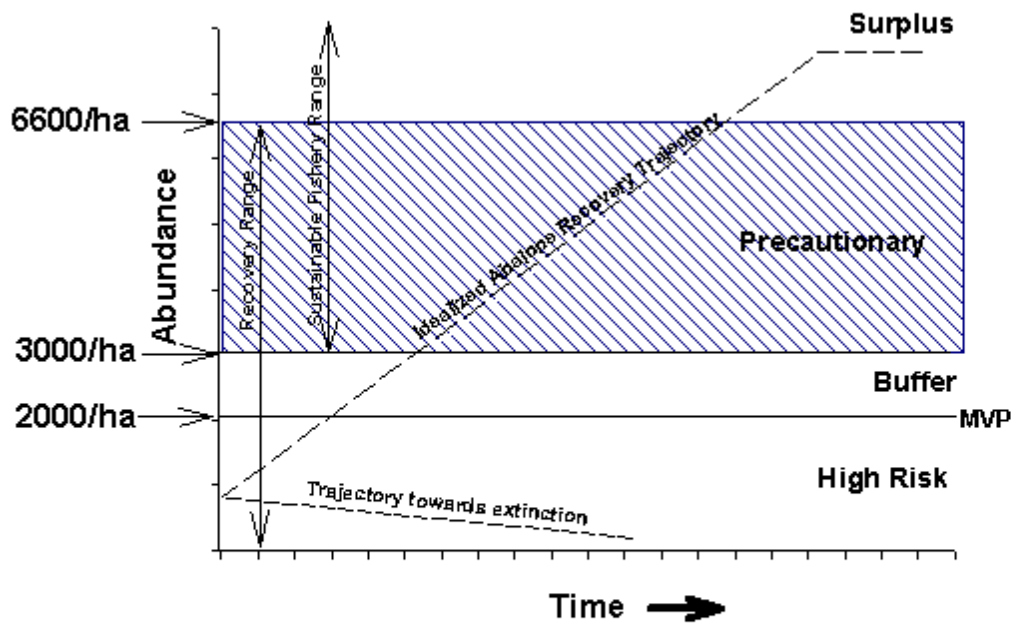


Figure 5-1. Conceptual approach for recovery and management under the ARMP. Note that in the precautionary area, fishing is only allowed in open fisheries that are subject to management under ARMP. As densities decline, catch levels are progressively reduced. Closed fisheries that are recovering will not be considered for reopening while their abundances are in the precautionary area. MVP = minimum viable population.